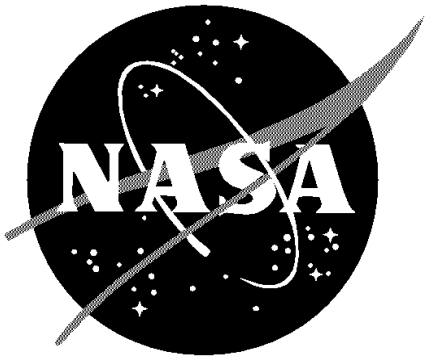

National Aeronautics and Space Administration

May 12, 1997

NRA-97-MTPE-06

RESEARCH ANNOUNCEMENT

INVESTIGATIONS OF ARCTIC ATMOSPHERE/ ICE/ OCEAN INTERACTIONS THAT AFFECT CLIMATE

OR

THE MASS BALANCE OF THE GREENLAND ICE SHEET

Letter of Intent due June 13, 1997
Proposals due July 14, 1997

OMB Approval No. 2700-0087

INVESTIGATIONS OF ARCTIC ATMOSPHERE/ ICE/ OCEAN INTERACTIONS THAT AFFECT CLIMATE OR THE MASS BALANCE OF THE GREENLAND ICE SHEET

NASA Research Announcement
Soliciting Research Proposals
For Research Commencing
On or After
October 1, 1997

NRA 97-MTPE-06

Office of Mission to Planet Earth
National Aeronautics and Space Administration
Washington, DC 20546

INVESTIGATIONS OF ARCTIC ATMOSPHERE/ ICE/ OCEAN INTERACTIONS THAT AFFECT CLIMATE or THE MASS BALANCE OF THE GREENLAND ICE SHEET

1.0 INTRODUCTION

The National Aeronautics and Space Administration (NASA) announces the solicitation of proposals for scientific investigations in support of Mission To Planet Earth (MTPE) program specific to investigations of Arctic atmosphere/ice/ocean interactions that affect climate or the mass balance of the Greenland ice sheet. This NASA Research Announcement (NRA) solicits proposals to investigate either of the above topics using data primarily from satellite and/or NASA aircraft sensors, or using theoretical models to improve either data interpretation or understanding of important processes. For the most part, complementary investigations that involve primarily in situ measurements should be addressed to the appropriate Programs at the National Science Foundation (details are given in Appendix A). However, NASA does support field work on the Greenland Ice Sheet, and in situ research in Greenland that complements remotely-sensed data may be proposed in response to this NRA.

2.0 Background

NASA's Polar Research Program has three main, long-term goals:

- improving the simulation of high-latitude processes in climate models;
- monitoring important polar observables, such as sea-ice characteristics; and
- measuring and understanding the mass balance of the Greenland and Antarctic ice sheets.

Specific objectives include:

(i) identification of polar processes that have a significant impact on global climate and climate change
(ii) derivation, from satellite data, of long-term, reliable time series of sea-ice extent, concentration, motion, surface temperature, albedo, and atmospheric characteristics above the sea ice;
(iii) estimation, using these time series together with in situ measurements from data buoys, of fluxes of energy, salt, and water at the ocean/ice/atmosphere interfaces;
(iv) investigation of the impact of these fluxes on ocean density structure and high-latitude ocean circulation;
(v) measurement, using satellite and aircraft data, of the mass balance of the Greenland and Antarctic ice sheets, and of some of the factors affecting it - snow accumulation, summer melt zones, and ice discharge down glaciers and ice streams;
(vi) improved understanding of the key processes that determine ice-sheet mass balance

Accomplishing these objectives requires development of improved techniques for estimating important geophysical parameters from satellite and in situ data, investigation of key processes and their mutual interaction, the use of models for data assimilation, and assessment of the sensitivity of the climate system to high-latitude processes.

The relevant satellite tools available to us include:

Passive Microwave (sea ice; snow cover; onset and extent of surface melting on sea ice and the ice sheets)

SAR (sea ice, including motion; ice-sheet mapping; glacier and ice-stream motion; ice-sheet surface characteristics)
Scatterometer (coarser resolution sea ice, including motion; ice-sheet surface characteristics)
AVHRR (sea ice, including albedo and temperature; clouds; ice-sheet morphology)
T**OVS** (atmospheric sounding; clouds)
Landsat and SPOT (ice-sheet and glacier mapping and motion)
Radar Altimeter (ice-sheet surface topography and thickening/thinning rates; sea-ice extent)
Laser Altimeter (ice-sheet surface topography and thickening/thinning rates; sea-ice surface roughness)

All the relevant satellite sensors, apart from the Laser Altimeter, are currently flying, and will continue through the next decade. Moreover, some of the data sets listed above extend back to the 1970s, providing us already with long time series, and a major priority of the Polar Program has been to develop algorithms to convert these data into useful estimates of sea-ice and ice-sheet characteristics, and to develop data systems to apply these algorithms and to distribute user-friendly data to the research community: at the National Snow and Ice Data Center [NSIDC], and the Alaska SAR Facility [ASF]).

For the most part, NASA polar research has focused attention on the Arctic, partly because of funding limitations, and partly because some of the necessary data, such as SAR, aircraft remote sensing, and in situ measurements, have been more readily obtained from the Arctic. However, it is clear that significant new satellite sources of Antarctic information are becoming available such as ERS tandem mission data and RADARSAT Antarctic Mapping Mission (RAMM), and when additional funding becomes available, NASA plans to issue an NRA for Antarctic research in future.

2.1 Atmosphere/ice/ocean interactions

Sea ice affects climate directly through its albedo and its role as an insulating barrier between the high-latitude ocean and atmosphere, and indirectly through its impact on polar clouds and the formation of deep ocean water masses. The net effect of these various processes appears to be large. Recent model studies indicate that almost 40% of model-simulated global warming in a doubled CO_2 world is induced by sea-ice feedback. Although existing models poorly represent sea ice and its interaction with the ocean and atmosphere and reality will almost certainly be very different from these model simulations, this result highlights the need to improve the simulation of sea-ice related processes in climate models. Improvement will require better understanding and model simulation of:

- Sea-Ice Albedo Feedback
- Sea Ice as a Heat and Moisture Barrier between Ocean and Atmosphere
- Polar-Cloud Feedback
- Sea Ice Impact on Ocean Water Circulation

Many climate simulations indicate a high-latitude amplification of greenhouse warming, with a tendency for this amplification to diminish as models take fuller account of ocean interactions and ice dynamics. However, there is still much to be learned, and the variability among model results is indicative of the sensitivity of the climate system to
high-latitude processes. Long time series of parameters such as sea-ice extent and thickness, surface temperature, and over-ice energy fluxes provide checks on the models, in addition to

supplying basic information for process studies. Ongoing NASA projects are attempting to compile such time series, and this NRA seeks to complement the existing studies.

2.2 Sea Ice

Sea-ice related priorities for the NRA include:

- Identification and quantification of key processes and parameters, involving polar ice, affecting local and global climate. This presumably can be approached by assessing which of these processes/parameters are important to modeled climate, or by using existing time series to identify teleconnections between polar ice cover and climate variables.

  This work is of key importance. Currently, it is difficult to prioritize polar research because we do not know which process or parameter is important in the grand scheme of global climate. Although this failing is by no means unique to polar research, it is made more intuitively justified to the lay mind by the physical remoteness of the polar regions.

- Improved understanding of the remarkable constancy of the annual sea-ice cycle. Despite the apparent sensitivity of the sea-ice cover in coupled climate models, there is only a small variability in the maximum and minimum total ice amounts although, regionally, variability is large. Work addressing this observation will include close examination of the regional variability and its phasing, and could help quantify the role of sea ice in climate.
- Investigation of changes in the Arctic climate system that appear to have been occurring, beginning in the late 1980s. These changes include the following: the spin-down or reduction in strength of the Beaufort Sea high pressure system; a late spring-early summer warming observed in the late 80's-early 90's; an enhanced melt-back of the summer ice, especially during 1990, 1993 and 1995; and a change in the Arctic Ocean circulation . In addition, ice in the East Siberian Sea may now be thinner than in previous years. In contrast to this potential Arctic warming, there are observations from many sources of a regional cooling in the Labrador Sea.

This work can also benefit from the extensive sets of time series data, both from remotely-sensed measurements and from in situ measurements, such as those becoming available from Russia.

- The model assimilation of satellite data to provide improved time series of "observables" such as sea-ice extent, concentration, and type, and "derivables" such as thickness distribution, energy fluxes etc. To some extent, existing NASA projects are addressing this problem, but there is certainly room for new ideas.

This is not an exclusive list, and it is not prioritized. Although it is anticipated that most proposals supported under this NRA will address the Arctic, it is clear that research on the first two topics above would benefit from inclusion of the Antarctic sea-ice cover, and such proposals will be considered appropriate to the NRA.

2.3 The mass balance of the Greenland Ice Sheet

Changes in the volume of the Greenland and Antarctic ice sheets have an immediate effect on sea level, and it is expected that such changes will be one consequence of global warming. But we are unable to predict just how large the changes would be, nor how rapidly they would take place. Moreover, we do not even know whether the volumes of these ice sheets are currently increasing or decreasing. Satellite altimetry offers the potential of measuring ice thickening/thinning rates over very large areas, and passive and active microwave imagery provides a great deal of

information on surface characteristics of the ice sheets. Ongoing research includes the application of the passive microwave time series, extending from 1978 to the present, to monitor summer melt-zone extent and intensity, and to estimate 10-meter temperatures. Other relevant imagery is the recently declassified high-resolution data from the 1960's Corona program, that can be compared with more recent images to reveal ice-sheet changes.

Data from a series of satellite radar altimeters, starting with Seasat in 1978, have been interpreted to indicate thickening of the southern part of the Greenland ice sheet, but interpretation has been complicated by issues related to data processing and satellite orbit determination. Although these issues are being resolved, the radar altimeter does not make useful measurements over slopes greater than about 1:60, and there are problems with the interpretation of data over ice associated with the large radar footprint and with radar penetration into the surface snow. Consequently, the Geoscience Laser Altimeter System (GLAS), planned for launch in 2001/2 as part of the Earth Observing System program, has ice-sheet mapping as its prime objective. Meanwhile, an aircraft laser altimeter and a radar depth sounder, with precise airplane navigation from kinematic Global Positioning System (GPS), were used in 1993/94 to map surface and bed topography to an accuracy of about 10 cm and ice depths to about 10 meters, along flight lines covering all the major Greenland ice sheet drainage basins and over many Arctic ice caps. Repeat flights, starting in 1998, will provide early indication of ice thickening/thinning rates prior to the launch of GLAS. NASA and NSF are also supporting several Automatic Weather Stations (AWS) at various locations on the Greenland ice sheet, and intensive field investigations to complement the information obtained remotely.

NASA has supported development of capabilities to apply interferometric SAR (INSAR) to measurement, at high spatial resolution, of surface topography and ice velocities on the Greenland and Antarctic ice sheets. Together with the airborne capability described above, this promises to revolutionize the study of ice sheets, offering the ability to measure most key ice-sheet parameters remotely, thus enabling large-area studies that would be far too costly by conventional means. This work is relevant to understanding the processes responsible for any changes detected by the laser-altimeter program.

Ice-sheet priorities for the NRA include:

- New ideas for the application of the various existing satellite, aircraft, and in situ data sets, with emphasis on the satellite radar altimetry, aircraft laser altimetry, SAR, and AWS data over Greenland. These should relate to the major NASA goal of measuring and understanding the mass balance of the Greenland ice sheet.

- Investigations of specific glaciological processes relevant to this goal, preferably using existing data sets, but with also the opportunity to request acquisition of "custom" data sets from NASA aircraft or from satellite SAR. It may also be possible to provide limited support for field work in Greenland. In addition investigators are encouraged to contact the relevant programs at NSF to explore the possibility of seeking joint NSF/NASA support where this is appropriate.

- Investigations, using theoretical models and available data, addressing the controls on surface accumulation and ablation, to improve our ability to assess likely changes in these parameters in an altered climate.

This list excludes Antarctic research, and it is clear that there are very important issues that are thus omitted: such as the effect of climate change on ice-shelf basal melting, and the role of ice shelves in ice-sheet response to global warming. This is partly a result of funding limitations, but it also

allows resources to be focused on problems that are potentially amenable to solution using data that either exist or are soon to be acquired. Lessons learned in addressing these problems can then be applied to Antarctica as more data and resources become available. In the future, NASA plans to issue an NRA on topics related to research in Antarctica.

In FY-1998, it is expected that approximately $3.0 M will be available to support this NRA.

3.0. PROPOSAL SUBMISSION AND SELECTION SCHEDULE

All prospective proposers are strongly encouraged to submit a letter of intent to propose to NASA in response to this announcement by the close of business on June 13, 1997.
This letter will help to expedite NASA's planning for the peer review. The letter of intent may be submitted electronically through the Internet by completing the forms at URL: *http://www.mtpe.hq.nasa.gov/LOI/form.html***.** You are urged to use these electronic letter of intent forms unless you do not have access to the Internet. In that case, we will accept a FAX copy sent to 202-554-3024 with the following information:

- PI and CoI names and addresses, (including Zip + 4);
- NRA Identifier;
- Title of proposal;
- Type of proposal (Type 1 or Type 2);
- Telephone number;
- Fax number;
- Email address; and
- A brief summary of your proposal including any plans for aircraft usage (Please limit this summary to no more than 3000 characters).

All proposals from investigators from the U.S. and other countries will be received and evaluated by NASA. All proposals submitted in response to this announcement are due, at NASA Headquarters, by the close of business on July 14, 1997. Late proposals will not be considered for review and funding, unless it is judged to be in the interest of the U.S. Government. All proposals submitted to NASA in response to this announcement must have a completed cover-sheet-form and information on current and pending research support from all other sources (see Appendix D) attached. A complete proposal schedule is given below:

Letter of Intent to Propose due -June 13, 1997

Proposals due at NASA Headquarters - - - - - - - - - - - - - - - - - July 14, 1997

Peer Review by Mail - - - - - - - - - - - - - - July 15, 1997- September 2, 1997
Meeting of Peer-Review Panels- - - - - - - ---------- September 10- 12, 1997

Announcement of Final Selections - - - - - - - - - - - - - - - - - - October 1, 1997

Additional information is provided in Appendices A-E of this Announcement. Appendix A provides information about National Science Foundation Programs that relate to this NRA.

Appendix B contains the instructions needed for preparation of solicited proposals in response to this announcement. Appendix C provides guidance for international participation. Appendix D provides the list of required declarations and the proposal cover sheet.

3.0 Identifier: NRA 97-MTPE-06

Submit proposals to:

MTPE NRA
Office of Mission to Planet Earth
Mail Code Y
400 Virginia Ave. SW, Suite 700
NASA Headquarters
Washington, DC 20024-3210

Proposals sent by commercial delivery service (e.g., Federal Express), US Postal Service Express, or hand carried should be addressed as follows:

MTPE NRA
Office of Mission to Planet Earth
Mail Code YS
400 Virginia Ave. SW, Suite 700
Washington, DC 20024-3210

Number of Copies Required: 10

Selecting Official:

Director, Science Division
Office of Mission To Planet Earth
NASA Headquarters

Point of Contact for Additional Information

Dr. S Gogineni, Program Manager
Mail Code YS
NASA Headquarters
Washington, DC 20546
Tel.: (202) 358-0746
Fax: (202) 358-2770
sgoginen@hq.nasa.gov

Additional information about any of the specific areas may be obtained by referencing the detailed points of contact identified in Appendix A.

Your interest and cooperation in participating in this opportunity are appreciated.

Original Signed By

William F. Townsend
Acting Associate Administrator for
Mission To Planet Earth

Enclosures:

Appendix A: Information about National Science Foundation Programs that relate to this NRA
Appendix B. Instructions for Responding to NASA Research Announcements
Appendix C. Guidelines for International Proposals
Appendix D. Proposal Cover Sheet, Formats, Forms, And Required Declarations

Appendix A

Opportunities for Interagency Support of Research Projects

NSF and NASA Arctic and Antarctic research have similar objectives, and proposals for in situ and perhaps modeling investigations that complement work proposed to NASA in response to this NRA can be submitted to the appropriate NSF Program Managers, who should be contacted for more details of the NSF program.

Appendix B

INSTRUCTIONS FOR RESPONDING TO NASA RESEARCH ANNOUNCEMENTS

(JANUARY 1997)

(a) General.

(1) Proposals received in response to a NASA Research Announcement (NRA) will be used only for evaluation purposes. NASA does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to an NRA to be used as the basis of a solicitation or in negotiation with other organizations, nor is a pre-award synopsis published for individual proposals.

(2) A solicited proposal that results in a NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material that NASA and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.

(3) NRAs contain programmatic information and certain requirements which apply only to proposals prepared in response to that particular announcement. These instructions contain the general proposal preparation information which applies to responses to all NRAs.

(4) A contract, grant, cooperative agreement, or other agreement may be used to accomplish an effort funded in response to an NRA. NASA will determine the appropriate instrument. Contracts resulting from NRAs are subject to the Federal Acquisition Regulation and the NASA FAR. Supplement. Any resultant grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1).

(5) NASA does not have mandatory forms or formats for responses to NRAs; however, it is requested that proposals conform to the guidelines in these instructions. NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers' most favorable terms.

(6) To be considered for award, a submission must, at a minimum, present a specific project within the areas delineated by the NRA; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific current or pending NASA solicitation.

(b) NRA-Specific Items. Several proposal submission items appear in the NRA itself: the unique NRA identifier; when to submit proposals; where to send proposals; number of copies required; and sources for more information. Items included in these instructions may be supplemented by the NRA.

(c) The following information is needed to permit consideration in an objective manner. NRAs will generally specify topics for which additional information or greater detail is desirable. Each proposal copy shall contain all submitted material, including a copy of the transmittal letter if it contains substantive information.

(1) Transmittal Letter or Prefatory Material.

(i) The legal name and address of the organization and specific division or campus identification if part of a larger organization;

(ii) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;

(iii) Type of organization: e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;

(iv) Name and telephone number of the principal investigator and business personnel who may be contacted during evaluation or negotiation;

(v) Identification of other organizations that are currently evaluating a proposal for the same efforts;

(vi) Identification of the NRA, by number and title, to which the proposal is responding;

(vii) Dollar amount requested, desired starting date, and duration of project;

(viii) Date of submission; and

(ix) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization (unless the signature appears on the proposal itself).

(2) **Restriction on Use and Disclosure of Proposal Information**. Information contained in proposals is used for evaluation purposes only. Offerors or quoters should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting an appropriate identification in the notice. In any event, information contained in proposals will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.

Notice

Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal the Government shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement). This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

(3) **Abstract.** Include a concise (200-300 word if not otherwise specified in the NRA) abstract describing the objective and the method of approach.

(4) **Project Description**.

(i) The main body of the proposal shall be a detailed statement of the work to be undertaken and should include objectives and expected significance; relation to the present state of knowledge; and relation to previous work done on the project and to related work in progress elsewhere. The statement should outline the plan of work, including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should address the evaluation factors in these instructions and any specific factors in the NRA. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described. Subcontracting significant portions of a research project is discouraged.

(ii) When it is expected that the effort will require more than one year, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should be on the first year of work, and the description should distinguish clearly between the first year's work and work planned for subsequent years.

(5) **Management Approach**. For large or complex efforts involving interactions among numerous individuals or other organizations, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.

(6) **Personnel**. The principal investigator is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. A short biographical sketch of the principal investigator, a list of principal publications and any exceptional qualifications should be included. Omit social security number and other personal items which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

(7) **Facilities and Equipment.**

(i) Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use. Include evidence of its availability and the cognizant Government points of contact.

(ii) Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative. Where such arrangements cannot be made, the proposal should so state. The need for items that typically can be used for research and non-research purposes should be explained.

(8) **Proposed Costs.**

(i) Proposals should contain cost and technical parts in one volume: do not use separate "confidential" salary pages. As applicable, include separate cost estimates for salaries and wages; fringe benefits; equipment; expendable materials and supplies; services; domestic and foreign travel; ADP expenses; publication or page charges; consultants; subcontracts; other miscellaneous identifiable direct costs; and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all staffing data in terms of staff-months or fractions of full-time.

(ii) Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired; purpose and estimated number and lengths of trips planned; basis for indirect cost computation (including date of most recent negotiation and cognizant agency); and clarification of other items in the cost proposal that are not self-evident. List estimated expenses as yearly requirements by major work phases.

(iii) Allowable costs are governed by FAR Part 31 and the NASA FAR Supplement Part 1831 (and OMB Circulars A-21 for educational institutions and A-122 for nonprofit organizations).

(9) **Security**. Proposals should not contain security classified material. If the research requires access to or may generate security classified information, the submitter will be required to comply with Government security regulations.

(10) **Current Support**. For other current projects being conducted by the principal investigator, provide title of project, sponsoring agency, and ending date.

(11) **Special Matters.**

(i) Include any required statements of environmental impact of the research, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines.

(ii) Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.

(d) **Renewal Proposals**

(1) Renewal proposals for existing awards will be considered in the same manner as proposals for new endeavors. A renewal proposal should not repeat all of the information that was in the original proposal. The renewal proposal should refer to its predecessor, update the parts that are no longer current, and indicate what elements of the research are expected to be covered during the period for which support is desired. A description of any significant findings since the most recent progress report should be included. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.

(2) NASA may renew an effort either through amendment of an existing contract or by a new award.

(e) **Length.** Unless otherwise specified in the NRA, effort should be made to keep proposals as brief as possible, concentrating on substantive material. Few proposals need exceed 15-20 pages. Necessary detailed information, such as reprints, should be included as attachments. A complete set of attachments is necessary for each copy of the proposal. As proposals are not returned, avoid use of "one-of-a-kind" attachments.

(f) **Joint Proposals**.

(1) Where multiple organizations are involved, the proposal may be submitted by only one of them. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated. In other instances, simultaneous submission of related proposals from each organization might be appropriate, in which case parallel awards would be made.

(2) Where a project of a cooperative nature with NASA is contemplated, describe the contributions expected from any participating NASA investigator and agency facilities or equipment which may be required. The proposal must be confined only to that which the proposing organization can commit itself. "Joint" proposals which specify the internal arrangements NASA will actually make are not acceptable as a means of establishing an agency commitment.

(g) **Late Proposals**. A proposal or modification received after the date or dates specified in an NRA may be considered if doing so is in the best interests of the Government.

(h) **Withdrawal.** Proposals may be withdrawn by the proposer at any time before award. Offerors are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances which dictate termination of evaluation.

(i) **Evaluation Factors**

(1) Unless otherwise specified in the NRA, the principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to NASA's objectives, intrinsic merit, and cost.

(2) Evaluation of a proposal's relevance to NASA's objectives includes the consideration of the potential contribution of the effort to NASA's mission.

(3) Evaluation of its intrinsic merit includes the consideration of the following factors of equal importance:

(i) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.

(ii) Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these which are integral factors for achieving the proposal objectives.

(iii) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.

(iv) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

(4) Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds.

(j) **Evaluation Techniques**. Selection decisions will be made following peer and/or scientific review of the proposals. Several evaluation techniques are regularly used within NASA. In all cases proposals are subject to scientific review by discipline specialists in the area of the proposal. Some proposals are reviewed entirely in-house, others are evaluated by a combination of in-house and selected external reviewers, while yet others are subject to the full external peer review technique (with due regard for conflict-of-interest and protection of proposal information), such as by mail or through assembled panels. The final decisions are made by a NASA selecting official. A proposal which is scientifically and programmatically meritorious, but not selected for award during its initial review, may be included in subsequent reviews unless the proposer requests otherwise.

(k) **Selection for Award**.

(1) When a proposal is not selected for award, the proposer will be notified. NASA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing.

(2) When a proposal is selected for award, negotiation and award will be handled by the procurement office in the funding installation. The proposal is used as the basis for negotiation. The contracting officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.

(l) **Cancellation of NRA**. NASA reserves the right to make no awards under this NRA and to cancel this NRA. NASA assumes no liability for canceling the NRA or for anyone's failure to receive actual notice of cancellation.

Appendix C

Guidelines for International Proposals

NASA accepts proposals from entities located outside the U.S. in response to this NRA. Proposals from non-U.S. entities should not include a cost plan. Non-U.S. proposals, and U.S. Proposals that include non-U.S. participation, must be endorsed by the respective government agency or funding/sponsoring institution in the country from which the non-U.S. participant is proposing. Such endorsement should indicate the following points: (1) The proposal merits careful consideration by NASA; and (2) If the proposal is selected, sufficient funds will be made available by the sponsoring foreign agency to undertake the activity as proposed.

Proposals, along with the requested number of copies and Letter of Endorsement must be forwarded to NASA in time to arrive before the deadline established for this NRA. In addition, one copy of each of these documents should be send to:

NASA Headquarters
Office of External Relations
Mission to Planet Earth Division
Mail Code IY
Washington, DC 20546
USA

Any materials sent by courier or express mail (e.g., Federal Express) should be sent to:

NASA Headquarters
Office of External Relations
Mission to Planet Earth Division
Mail Code IY
300 E Street, SW
Washington, DC 20024-3210

All proposals must be typewritten in English. All non-U.S. proposals will undergo the same evaluation and selection process as those originating in the U.S. Non-U.S. proposals and U.S. Proposals that include non-U.S. participation, must follow all other guidelines and requirements described in this NRA. Sponsoring non-U.S. agencies may, in exceptional situations, forward a proposal without endorsement to the above address, if review and endorsement are not possible before the announced closing date. In such cases, however, NASA's Mission to Planet Earth Division of the Office of External Relations should be advised when a decision on the endorsement is to be expected.

Successful and unsuccessful proposers will be contacted directly by the NASA Program Office coordinating the NRA. Copies of these letters will be sent to the sponsoring government agency.

Appendix D

Proposal Cover Sheet, Formats, Forms, and Required Declarations

Proposal Cover Sheet
NASA Research Announcement 97-MTPE-06

Proposal No. _____ (Leave Blank for NASA Use)

Title: _____

Principal Investigator:

Name:_____

Department:_____

Institution: _____

Street/PO Box: _____

City: _____ State: _____ Zip: _____

Country: _____ E-mail: _____

Telephone: _____ Fax: _____

Co-Investigators: Name Institution Telephone

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

Budget:
1st Year: _____ 2nd Year: _____ 3rd Year: _____

Total: _____

Authorizing Official: _____ _____
(Name) (Institution)

Proposal Summary (1-page only)

NASA Research Announcement 97-MTPE-06

PRINCIPAL INVESTIGATOR
(Name, Address,
Telephone, Email)

Co-INVESTIGATORS:
(Name and Affiliation Only)

PROPOSAL TITLE:

PROPOSAL COST: Yr1 Yr2 Yr3

ABSTRACT: (Single-space, typed). Include: (a) Objectives and justification for work; (b) Accomplishments of prior year's work; (c) Outline of proposed work and methodology; (d) One or two relevant recent publications authored by the PI or Co-I. **DO NOT USE ADDITIONAL SHEETS**.

Current And Pending Research Support
From All Other Sources

All proposals must include this information. This list should include all current and pending research support from the following sources:

1. Any proposal for which the PI of this proposal is also the Principal Investigator.

2. Any proposal, regardless of the PI, which accounts for more than 20% of the time of the Principal Investigator of this proposal and other personnel essential to this proposal.

Please provide this information in the following format:

I. Principal Investigator

A. Current FY 97 Support

1. Source of Support and Principal Investigator
2. Award Amount and Period of Performance
3. Person-Months and Level of Effort
4. Project Title and Short Abstract (50 words or less)

B. Pending Proposals (Excluding this proposal but including other proposals).

1. Source of Support and Principal Investigator
2. Award Amount and Period of Performance
3. Person-Months and Level of Effort
4. Project Title and Short Abstract (50 words or less)

For both current and pending support provide information on:

II. Co-Investigators

As outlined above, provide information on all Current and Pending Support. Disclosure of current and pending research support is not required for collaborators.

III. Other agencies to which this proposal, or parts thereof, has been submitted.

Suggested Contents

Certification Regarding
Debarment, Suspension, and Other Responsibility Matters
Primary Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participant's responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211). Copies of the regulation may be obtained by contracting the U.S. Department of Education, Grants and Contracts Service, 400 Maryland Avenue, S.W. (Room 3633 GSA Regional Office Building No. 3), Washington, DC. 20202-4725, telephone (202) 732-2505.

(1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name PR/Award Number or Project Name

Name and Title of Authorized Representative

Signature Date

Certification Regarding Drug-Free Workplace Requirements
Grantees Other Than Individuals

This certification is required by the regulations implementing the Drug-Free Workplace Act of 1988, 34 CFR Part 85, Subpart F. The regulations, published in the January 31, 1989 Federal Register , require certification by grantees, prior to award, that they will maintain a drug-free workplace. The certification set out below is a material representation of fact upon which reliance will be placed when the agency determines to award the grant. False certification or violation of the certification shall be grounds for suspension of payments, suspension or termination of grants, or government wide suspension or debarment (see 34 CFR Part 85, Sections 85.615 and 85.620).

This grantee certifies that it will provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(b) Establishing a drug-free awareness program to inform employees about -

(1) The dangers of drug abuse in the workplace;
(2) The grantee's policy of maintaining a drug-free workplace;
(3) Any available drug counseling, rehabilitation, and employee assistance programs, and
(4) The penalties that may be imposed upon employees for drug abuse violations in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will -

(1) Abide by the terms of the statement; and
(2) Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after such conviction;

(e) Notifying the agency within ten days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction;

(f) Taking one of the following actions, within 30 days of receiving notice under subparagraph (d)(2) , with respect to any employee who is so convicted -

(1) Taking appropriate personnel action against such an employee, up to and including termination; or
(2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraph (a), (b), (c), (e), and (f).

Organization Name PR/Award Number or Project Name

Name and Title of Authorized Representative

Signature Date

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements.

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000, and not more than $100,000 for each such failure.

Signature and Date

Name and Title of Authorized Representative

Organization Name